

# Impact of problem-based pharmacotherapy course on the competence of rational prescribing of Sudanese undergraduate medical students

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## Abstract

**Background:** Prescription writing is a skill that almost every doctor will use several times a day. But are medical students effectively taught how to write a complete and accurate prescription? Most commonly the answer is no. There is increasing need for the rational use of medicines and the clearly appropriate prescribing is a key to achieve this.

**Objectives:** To find out whether a short training course of problem-based pharmacotherapy teaching, improves the competence of rational prescribing among medical students.

**Methods:** All 6<sup>th</sup> year medical students (Batch 13), Omdurman Islamic university were randomly separated into intervention and control group. Students of intervention group were taught to choose P-drug for different diseases and how to apply this choice to specific patient problem, using the WHO- six steps problem solving approach.

**Results:** The competence of intervention group is significantly better than the control group  $p = 0.011$ . The mean results of post test for intervention group was  $[3.4 \pm 4.5]$  and for the control group was  $[2.1 \pm 1.9]$ .

**Conclusion:** Teaching medical students all basic knowledge about drugs does not guarantee rational prescribing. Additional short course of problem-based pharmacotherapy could be effective in improving prescribing skills among Sudanese medical students.

## Background

Prescribing of drugs in current practice is often inappropriate and irrational. There is a great need to ensure that drugs are prescribed and used rationally<sup>1</sup>. Irrational drug prescribing includes practices such as polypharmacy, wrong medication for the diagnosis, use of expensive drugs when less expensive alternatives are available, use of wrong dose (both over and under-dose), and prescribing when medications are not necessary<sup>2</sup>. The rationality of the scripts prescribed by physician is of critical importance, since bad prescribing habits lead to ineffective and unsafe treatment, causing exacerbation or prolongation of disease and distress or harm to the patient, which add extra burden to the health budgets<sup>3</sup>.

Many factors affect a doctor's prescribing behaviour, such as education, marketing, relationships to the pharmaceutical companies, colleagues, regulatory actions, demands from society and patients and personal characteristics of the doctor<sup>4</sup>. It seems that already bad prescribing behaviour is difficult to cure. Probably, a more effective way to prevent the irrational prescribing is through proper undergraduate training<sup>5,6</sup>.

Most medical schools and health institutes are still using traditional methods for teaching pharmacology i.e. transferring knowledge on drugs through lectures. Further more during clinical training the emphasis is much more on diagnosis than therapeutics, and little time is left

for pharmacotherapy, therefore there is no structural training regarding how to use the knowledge about drugs when actually treating patients, and medical students are not always trained adequately in rational therapy<sup>7</sup>.

Medical students, as tomorrow's doctors, need training in clinical pharmacology, particularly focused on rational pharmacotherapy as well as basic pharmacological knowledge in order to make pharmacotherapy decisions. Clinical pharmacology is a 'bridging field' of medicine that aims to promote rational use of drugs<sup>8</sup> which is defined as a drug treatment that is expected to be effective, safe, convenient and low cost<sup>9</sup>.

Undergraduate education focused on rational pharmacotherapy was one of the solutions offered to repair the deficiencies of classical teaching of clinical pharmacology<sup>10</sup>. Problem-based pharmacotherapy is a training course developed by World Health Organization (WHO) using a normative model known as Student Guide to Good Prescribing. This model of problem-based pharmacotherapy teaching was introduced and tested in several faculties in both developed and developing countries, which have shown significant improvement in the ability of senior medical students to choose the drug rationally.

The objective of this study was to assess the effectiveness of a short training course of problem-based pharmacotherapy teaching in improving the competence in rational prescribing skills among undergraduate medical students in Sudan.

## Methods

The impact of teaching problem-based pharmacotherapy was measured by means of

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objective post-test and subjective questionnaire evaluation during the period from Dec 2006-

Feb 2007. The sixth (final) year class of 2006-2007 (Batch 13) of faculty of medicine-Omdurman Islamic University- was randomly assigned into two groups, intervention group (n=93) and control group (n=125), simply on basis of their internal medicine rotation assignment for one group rotation of males and females students

This is part of routine scheduling of their clerkship. This assignment therefore was not biased because we did not determine the students in each group. Both groups had already studied classical teaching of pharmacology during preclinical years. The intervention group was invited to participate in two days (4 hours) course problem-based pharmacotherapy delivered in small subgroups of 10 students.

They were provided with WHO's Guide to Good Prescribing sheet as one of the key references in this course, British National Formulary and materials related was provided. At the end of each session the study group was provided with a questionnaire to address student' satisfaction with the course.

During the training course, students of the study group were first introduced to the WHO concept of The Guide to Good Prescribing. Briefly students learned to develop a standard pharmacotherapeutic -approach- to selected indications resulting in a set of self selection for the best drug of choice selected by a person called P (Personal)-drug according to the criteria of efficacy, safety, suitability and cost. They were taught to solve different patient problems in different clinical topics and to apply these drugs

to specific patient problems using step by step approach, the approach include six basic steps<sup>3</sup>:

- 1/ define the patient's problem.
- 2/ specify the therapeutic objective.
- 3/ choose the treatment for that specific patient.
- 4/ write a prescription.
- 5/ give information and advice to the patient.
- 6/ monitor and/or stop the treatment.

Mixing and exchange of the information was not expected between the control and intervention group because each group studying in a different rotation assignments.

After finishing the course to the assigned intervention group, a competence in rational prescribing was assessed through a final test for both groups, consisting of three problem- based cases. Baseline testing would identify potential variance between students' abilities. However baseline testing was not performed as it may alert students to the study and the possibility of further tests and hence potentially bias the study results.

#### Statistical analysis

The result of both groups was computed to the points achieved in each group. For comparison of mean, student's *t*-test was used to determine whether there is a true difference in the test results between two groups.

#### Results

Of the 93 students allocated in the intervention group 43 (46%) were males and. Only one female (2%) and two males (5%) did not attend the session.

#### Test Results:

The mean ( $\pm$ SD) score of the objective post test was  $[3.4 \pm 4.5]$  for the intervention group which is significantly better than that of the control group  $[2.1 \pm 1.9]$  ( $P = 0.011$ ).

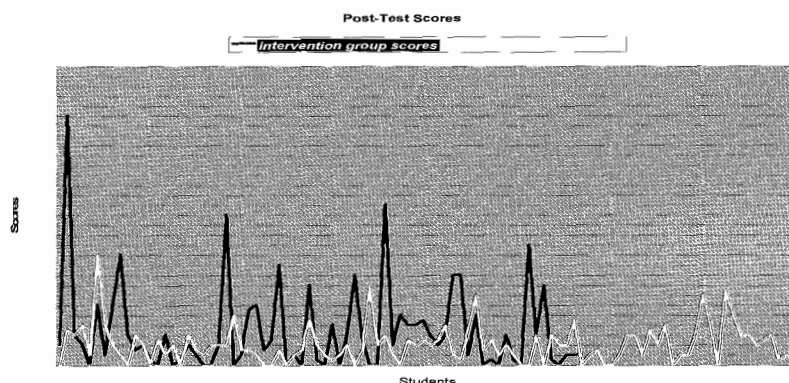


Figure (1) shows the student scores of the intervention group and control group.

#### Questionnaire Results:

Table (1) shows the questionnaire results (n =75)

| N0 | Statement                                                                                                                         | I Strongly agree | I Agree | I have no definite decision | I disagree | I strongly disagree |
|----|-----------------------------------------------------------------------------------------------------------------------------------|------------------|---------|-----------------------------|------------|---------------------|
| 1  | I found the subject of problem-based pharmacotherapy course interesting.                                                          | 54               | 18      | 1                           | 1          | 0                   |
| 2  | I found the course necessary.                                                                                                     | 51               | 23      | 0                           | 0          | 0                   |
| 3  | The learning outcome of problem-based pharmacotherapy was adequate.                                                               | 26               | 38      | 6                           | 3          | 0                   |
| 4  | I felt well informed on problem-based pharmacotherapy.                                                                            | 22               | 34      | 11                          | 4          | 0                   |
| 5  | I consider problem-based pharmacotherapy to be an effective learning of clinical pharmacology and therapeutics.                   | 35               | 35      | 2                           | 1          | 0                   |
| 6  | I consider problem-based pharmacotherapy learning better than traditional lectures learning of pharmacology.                      | 46               | 14      | 8                           | 4          | 1                   |
| 7  | I think the course suited the level of my knowledge.                                                                              | 20               | 48      | 5                           | 1          | 0                   |
| 8  | The PBL cases illustrate medical concepts.                                                                                        | 14               | 45      | 7                           | 1          | 0                   |
| 9  | The case motivated me to use additional learning resources.                                                                       | 22               | 42      | 5                           | 0          | 0                   |
| 10 | The group climate facilitated the learning process.                                                                               | 37               | 32      | 3                           | 1          | 0                   |
| 11 | I think the six steps will guide me to rational prescribing.                                                                      | 41               | 34      | 0                           | 0          | 0                   |
| 12 | I don not think these steps will be applicable in my medical practice.                                                            | 0                | 15      | 3                           | 41         | 11                  |
| 13 | I will recommend this problem-based pharmacotherapy for other students.                                                           | 31               | 33      | 5                           | 1          | 2                   |
| 14 | From problem-based pharmacotherapy tutorial I learned something for dealing with patients.                                        | 37               | 34      | 1                           | 0          | 0                   |
| 15 | From problem-based pharmacotherapy course, I could improve my communication skills, and will communicate better with my patients. | 40               | 30      | 2                           | 1          | 0                   |
| 16 | I consider the knowledge and behavioural changes gained will be transient.                                                        | 6                | 16      | 9                           | 28         | 9                   |
| 17 | I will apply most principles of problem-based pharmacotherapy in my future medical practice.                                      | 32               | 37      | 3                           | 1          | 0                   |
| 18 | I think the problem-based pharmacotherapy is an essential component for medical education.                                        | 51               | 20      | 2                           | 0          | 0                   |
| 19 | I think the problem-based pharmacotherapy will offer an advantage over other medical schools.                                     | 30               | 33      | 7                           | 0          | 1                   |
| 20 | Now I am confident to write a rational prescription.                                                                              | 34               | 32      | 4                           | 1          | 0                   |

As a reply to the direct questions 90% of students affirmed their need for more time, sessions and problems from the course, and suggested that this course should be taught earlier than the final year.

#### Discussion

The results showed that a short training course of problem-based pharmacotherapy, based on WHO *Guide to good prescribing* significantly improved the ability of students to solve patient problems. Similar results have been obtained from different studies conducted in different medical institutes.<sup>11-17</sup>

Overall responses to the questionnaire were positive. The majority of the students rated the course to be helpful and useful in prescription writing, but for the best outcome more time should be considered. The problem-based environment was also well perceived and considered as interactive and encouraging method of learning .

#### Conclusions

The preclinical traditional lectures of pharmacology taught the student what to choose for different diseases studied but the problem at clinical and final years is how to choose and we think additional course of problem based pharmacotherapy could solve this problem, and

will be an effective approach for rational prescribing.

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